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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,536	03/10/2004	Yan Zhou	10095-35	2535
757	7590	12/23/2008	EXAMINER	
BRINKS HOFER GILSON & LIONE P.O. BOX 10395 CHICAGO, IL 60610				CHIEM, DINH D
ART UNIT		PAPER NUMBER		
		2883		
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		12/23/2008		
		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/708,536	ZHOU ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	ERIN D. CHIEM	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 02 December 2008.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 47-75 is/are pending in the application.  
 4a) Of the above claim(s) 60,62 and 63 is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 47-59,61 and 64-75 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_.

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

The examiner reviewed the Provisional Application 60/454806 and agrees with applicant that no new matter has been introduced in the Non-Provisional application 10/708536. However, in further considering the claim interpretation in light of applicant's remarks, the examiner found prior art would read upon applicant's current broad claim limitation.

### ***Election/Restrictions***

This application contains claim 60, and 62-63 drawn to an invention nonelected with traverse in the reply filed on March 21, 2007. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

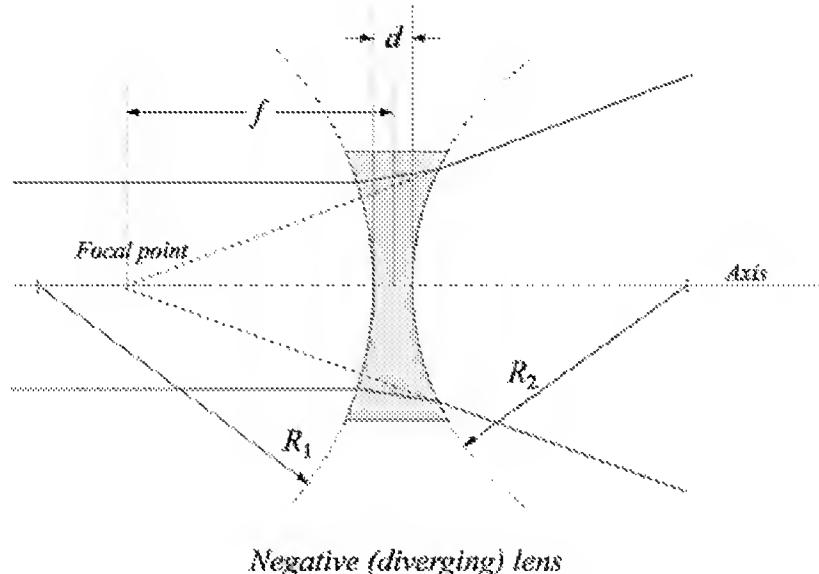
**Claims 47-50, 54-56, 59, 64-75 are rejected under 35 U.S.C. 102(b) as being anticipated by Blankenbecler (US 5,044,737).** Blankenbeckler teaches, in terms of claim 47 and 48, an apparatus suitable for controlling the size and the phase of an electromagnetic beam, the apparatus comprising:

a. a substrate (glass plates [col. 3, lines 40-54]); and  
b. an axially graded refractive index multi layer structure deposited on the substrate (multiple glass plates), the multilayer structure including a GRIN film (thin sheets of glass (dictionary.com definition 2.) forming the gradient index as disclosed in Col. 3, lines 40-54) and a curved input sidewall and a curved output sidewalls (Fig. 3). The examiner would like to note that the term "vertically graded refractive index" is known in the art as "axial graded refractive index" which more accurately describes the gradient distribution since a horizontal graded index lens turning 90 degree would be a vertically graded refractive index. Furthermore, the limitation wherein the "apparatus is used to independently control a vertical focusing and a horizontal focusing of the electromagnetic beam" is not given patentable weight because said limitation is intended use and since Blankenbeckler double axial gradient lens is capable of performing the function, then Blankenbeckler anticipated said limitation (MPEP 2111.03).

The Examiner notes that claim 48 limitation—*wherein the curved input sidewall and the curved output sidewall are fabricated by photolithography and etching with an etching mask comprising: a) at least one of a metal layer...and the polysilicon layer*—is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Blankenbeckler (see MPEP 2113).

Regarding claims 49-50, Blankenbeckler discloses the substrate comprises a glass and furthermore examiner takes official notice that glass comprises of Si.

Regarding claim 54, applicant is attempting to claim the basic operating principles of lenses. The examiner would like to introduce a teaching reference from wikipedia.com (contributed on October 27, 2003). A biconcave lens shows a clear example of “the horizontal focusing is controlled by varying at least one of a radius of curvature of a surface of the curved input sidewall and a radius of curvature of a surface of the curved output sidewall.



and the focal length of the lens is defined by

$$\frac{1}{f} = (n - 1) \left( \frac{1}{R_1} - \frac{1}{R_2} + \frac{(n - 1)d}{nR_1R_2} \right)$$

*d* is defined as the distance between the radius of curvature between the input and output sidewall; wherein from the equation, one can see *d* is a controlling factor of the focal point (horizontal) of the lens. The gradient in a GRIN lens changes the refractive index *n* however, the distance *d* continues to contribute to the horizontal focus. Therefore, one having ordinary skill in

the art such as Blankenbeckler would recognize the radius of curvature controls the horizontal focusing function of the lens since Blankenbeckler discloses the lens shape may be convex-convex (biconvex), concave-concave (biconcave), concave-convex, or convex concave.

The Examiner notes that claim 55 limitation—*wherein the thickness of the GRIN multilayer structure is varied by etching*—is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Blankenbeckler (see MPEP 2113).

The Examiner notes that claim 56 limitation—*wherein a radius of curvature of a surface of the curved input sidewall and the radius of curvature of a surface of the curved output sidewall are varied by etching*—is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Blankenbeckler (see MPEP 2113).

Regarding claim 59, Blankenbeckler discloses the curved input/output sidewalls comprises of a spherical shape.

Regarding claim 61, Blankenbeckler discloses a biconvex lens wherein the radii of curvature are different since the left (input) side has a positive radius of curvature and the right (output) side has a negative radius of curvature.

Regarding claims 64 and 75, Blankenbeckler discloses a biconvex lens wherein the radii of curvature have different signs since the left (input) side has a positive radius of curvature and the right (output) side has a negative radius of curvature.

Regarding claim 65, Fig. 9c of the Specification shows the lens 1000 appears to be a quadruple-convex lens and such configuration is hardly *arbitrary* as disclosed and claimed. With all due respect, perhaps such “arbitrary” values are possibly novel, but without any claimed structural relevance, the examiner cannot give such “arbitrary” values patentable weight. Let’s entertain the idea of an arbitrary curve, the examiner would like to note any manufacturing process would have a percentage of defective manufactured devices. Said defective devices do not possess the correct manufacturing specification of a curved shaped, thus the process would manufacture an “arbitrary curved shape” lens.

Regarding claim 66, Fig. 9d of the Specification shows the lens 1000 appears to have an axial gradient in the y-direction and such gradient is hardly *arbitrary* as disclosed and claimed. With all due respect, perhaps such “arbitrary” values are possibly novel, but without any claimed structural relevance, the examiner cannot give such “arbitrary” values patentable weight. Let’s entertain the idea of an arbitrary refractive index variation, the examiner would like to note any manufacturing process would have a percentage of defective manufactured devices. Said defective devices do not possess the correct manufacturing specification of a refractive index variation, thus the process would manufacture an “arbitrary refractive index variation.”

Regarding claim 69, applicant is attempting to claim a physical shape of a well established principle of optical lens. The curved input sidewall and curved output sidewall comprise a three dimensional curved surface such that a radius of curvature of the curved input and output radius of curvature diminished with a departure from a vertical central region of the GRIN film (biconvex, biconcave), which Blankenblecker teaches.

Regarding claim 70, applicant does not define what "standard distribution" represents; therefore, examiner would like to note Blankenblecker also discloses a standard distribution since the rays drawn by Blankenblecker appears to be standard distribution (Fig. 3).

Regarding the limitation wherein the lens is coated with an antireflection coating. The examiner would like to take official notice that anti-reflection coating is well-known used method of producing lens to reduce back reflection.

**Claims 47-50, 54-56, 59, 67-68 and 73 are rejected under 35 U.S.C. 102(b) as being anticipated Blum (US 5,861,934).** Blum teaches, in terms of claim 47 and 48, an apparatus suitable for controlling the size and the phase of an electromagnetic beam, the apparatus comprising:

a. a substrate (10); and

b. an axially graded refractive index multi layer structure deposited on the substrate

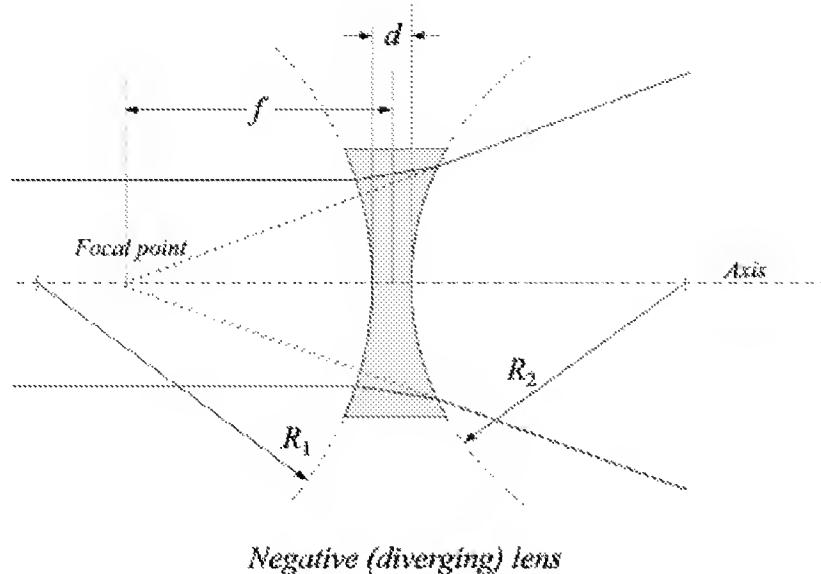
(multiple glass plates), the multilayer structure including a GRIN film (Blum citing Xu's reference incorporated see cols. 6-8 line 27) and a curved input sidewall and a curved output sidewalls (Fig. 4). The examiner would like to note that the term "vertically graded refractive index" is known in the art as "axial graded refractive index" which more accurately describes the gradient distribution since a horizontal graded index lens turning 90 degree would be a vertically

graded refractive index. Furthermore, the limitation wherein the “apparatus is used to independently control a vertical focusing and a horizontal focusing of the electromagnetic beam” is not given patentable weight because said limitation is intended use and since Blum’s incorporated disclosure of Xu axial gradient lens is capable of performing the function, then Blum anticipated said limitation (MPEP 2111.03).

The Examiner notes that claim 48 limitation—*wherein the curved input sidewall and the curved output sidewall are fabricated by photolithography and etching with an etching mask comprising: a) at least one of a metal layer...and the polysilicon layer*—is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Blum (see MPEP 2113).

Regarding claims 49-50, Blum discloses the substrate comprises a glass and furthermore examiner takes official notice that glass comprises of Si.

Regarding claim 54, applicant is attempting to claim the basic operating principles of lenses. The examiner would like to introduce a teaching reference from wikipedia.com (contributed on October 27, 2003). A biconcave lens shows a clear example of “the horizontal focusing is controlled by varying at least one of a radius of curvature of a surface of the curved input sidewall and a radius of curvature of a surface of the curved output sidewall.



and the focal length of the lens is defined by

$$\frac{1}{f} = (n-1) \left( \frac{1}{R_1} - \frac{1}{R_2} + \frac{(n-1)d}{nR_1 R_2} \right)$$

$d$  is defined as the distance between the radius of curvature between the input and output sidewall; wherein from the equation, one can see  $d$  is a controlling factor of the focal point (horizontal) of the lens. The gradient in a GRIN lens changes the refractive index  $n$  however, the distance  $d$  continues to contribute to the horizontal focus. Therefore, one having ordinary skill in the art such as Blum would recognize the radius of curvature controls the horizontal focusing function of the lens.

The Examiner notes that claim 55 limitation—*wherein the thickness of the GRIN multilayer structure is varied by etching*—is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an

unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Blum (see MPEP 2113).

The Examiner notes that claim 56 limitation—*wherein a radius of curvature of a surface of the curved input sidewall and the radius of curvature of a surface of the curved output sidewall are varied by etching*— is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Blum (see MPEP 2113).

Regarding claim 59, Blum discloses the curved input/output sidewalls comprises of a spherical shape.

Regarding claim 67, Blum discloses the curved output sidewall comprises an anti-reflection coating (col. 8, lines 52-60).

Regarding claim 68, one having ordinary skill in art such as Blum would design a coating on a basis of an optimum equivalent index that leads to a maximum electromagnetic wave transmission.

Regarding claim 73, although Blum does not explicitly disclose the GRIN lens is operable in the visible spectrum, however, Blum's GRIN lens is used in cosmetic vision correction lens (Background).

**Claims 47-50, 54-56, 59, 61, 64 67-68 and 73 are rejected under 35 U.S.C. 102(b) as being anticipated Foo (US 5,621,574).**

Foo teaches, in terms of claim 47 and 48, an apparatus suitable for controlling the size and the phase of an electromagnetic beam, the apparatus comprising:

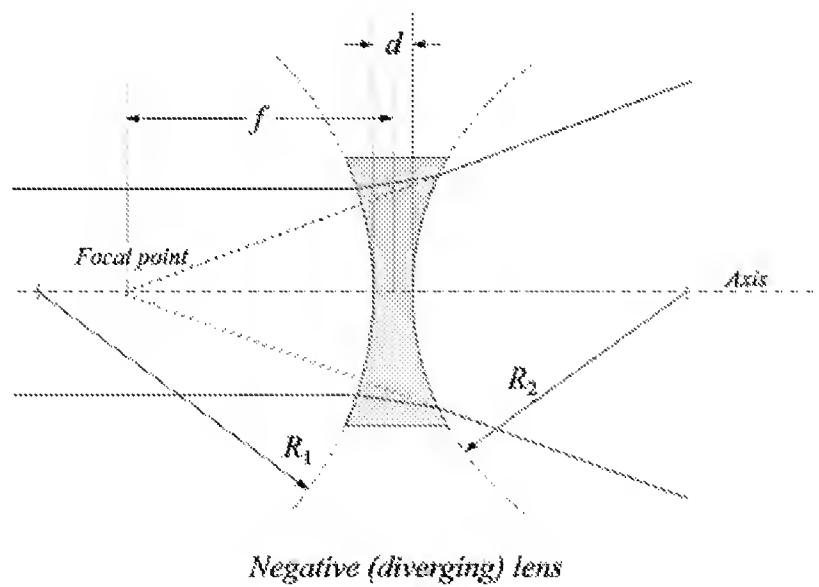
- a. a substrate; and
- b. an axially graded refractive index multi layer structure deposited on the substrate

(multiple glass plates), the multilayer structure including a GRIN film (col. 1, line 15-37) and a curved input sidewall and a curved output sidewalls (Fig. 4). The examiner would like to note that the term "vertically graded refractive index" is known in the art as "axial graded refractive index" which more accurately describes the gradient distribution since a horizontal graded index lens turning 90 degree would be a vertically graded refractive index. Furthermore, the limitation wherein the "apparatus is used to independently control a vertical focusing and a horizontal focusing of the electromagnetic beam" is not given patentable weight because said limitation is intended use and since Foo gradient lens is capable of performing the function, then Foo anticipated said limitation (MPEP 2111.03).

The Examiner notes that claim 48 limitation—*wherein the curved input sidewall and the curved output sidewall are fabricated by photolithography and etching with an etching mask comprising: a) at least one of a metal layer...and the polysilicon layer*—is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Blum (see MPEP 2113).

Regarding claims 49-50, Blum discloses the substrate comprises a glass and furthermore examiner takes official notice that glass comprises of Si.

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and the focal length of the lens is defined by

$$\frac{1}{f} = (n - 1) \left( \frac{1}{R_1} - \frac{1}{R_2} + \frac{(n - 1)d}{nR_1R_2} \right)$$

$d$  is defined as the distance between the radius of curvature between the input and output sidewall; wherein from the equation, one can see  $d$  is a controlling factor of the focal point

(horizontal) of the lens. The gradient in a GRIN lens changes the refractive index  $n$  however, the distance  $d$  continues to contribute to the horizontal focus. Therefore, one having ordinary skill in the art such as Foo would recognize the radius of curvature controls the horizontal focusing function of the lens.

The Examiner notes that claim 55 limitation—*wherein the thickness of the GRIN multilayer structure is varied by etching*—is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Foo (see MPEP 2113).

The Examiner notes that claim 56 limitation—*wherein a radius of curvature of a surface of the curved input sidewall and the radius of curvature of a surface of the curved output sidewall are varied by etching*—is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Foo (see MPEP 2113).

Regarding claim 59, Blum discloses the curved input/output sidewalls comprises of a spherical shape (E<sub>1</sub> and E<sub>6</sub>).

Regarding claim 61, Foo discloses the input sidewall and the output sidewall have different radii of curvature (Fig. 2; E<sub>1</sub> and E<sub>6</sub>).

Regarding claim 64 and 75, lens E<sub>6</sub> have different signs, positive from the input sidewall and negative from the output sidewall.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art disclosed by Wang (US 2003/0067688 A1) discloses a multi layer axial graded index lens having curved sidewalls.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIN D. CHIEM whose telephone number is (571)272-3102. The examiner can normally be reached on Monday - Thursday 9AM - 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Erin D Chiem/  
Examiner, Art Unit 2883

/Frank G Font/  
Supervisory Patent Examiner, Art Unit 2883